1. (Previously Presented) A method of simulating an industrial process comprising the steps of:

storing model data indicative of a plurality of processes involving a number of items of equipment to be used in an industrial process to be simulated;

initiating a first simulated batch for simulated processing;

generating scheduling data for scheduling the initiation of simulated batches after the initiation of said first simulated batch by, when simulated processing of a latest initiated batch is initiated:

identifying items of equipment liable to be involved in simulated processing of a next batch to be initiated after said latest initiated batch;

utilizing said stored model data to determine for each item of said identified items of equipment a minimum possible simulated processing time required for simulated processing of said latest initiated batch;

determining for said identified items of equipment which are currently in use for processing batches currently being processed, the greatest time of use of previously simulated in processing batches using said items of equipment; and

generating scheduling data for the next batch to be initiated after the latest initiated batch to cause the time between the initiation of said latest initiated batch and said next batch within said simulation to be equal to the greater of the maximum of said minimum possible simulated processing times for said items of equipment involved in simulated processing of said next batch and said greatest time of use for said identified items of equipment currently in use; and

generating output data indicative of a simulation of an industrial process utilizing said stored model data and said generated scheduling data.

2. (Previously presented) A method in accordance with claim 1, wherein said determination of the greatest time of use of an item of equipment utilized in processing comprises the steps of:

storing in association with each item of equipment to be simulated data indicative of the time of use of said item of equipment for a batch previously processed by said item of equipment; and

determining as the greatest time of use the greatest time of use of said stored times of use.

3. (Original) A method in accordance with claim 1, wherein said determining of the greatest time of use of an item of equipment further comprises for each of the said items of equipment the steps of:

determining whether an item of equipment is in use; and if an item of equipment is in use determining the total time the item of equipment has been in use for a current batch; and if an item of equipment is no longer in use storing said total time in use as said time in use for said equipment.

4. (Original) A method in accordance with claim 3, wherein each of said items of equipment is associated with a number of processes wherein said determination of whether an item of equipment is in use comprises determining whether any of said processes associated with said item of equipment is currently being simulated.

5. (Previously Presented) A method in accordance with claim 1,

wherein said utilizing said stored model data to determine a minimum possible simulated processing time for each of said identified items of equipment comprises storing, for each batch to be initiated, data indicative of the greatest of said minimum possible processing times; and

wherein said generating scheduling data for the next batch to be initiated after the latest initiated batch comprises utilizing said data indicative of the greatest of said minimum possible processing times to generate said scheduling data.

6. (Previously Presented) A method in accordance with claim 1, wherein said utilizing said stored model data to determine a minimum possible simulated processing time for each of said identified items of equipment comprises:

associating, with a batch to be initiated, data to be indicative of the items of equipment to be utilized in simulated processing of said batch; and

determining said minimum possible simulated processing time for each item of equipment associated with said batch to be initiated.

7. (Previously Presented) A method in accordance with claim 6, wherein each of the said items of equipment is associated with a number of processes, each of said processes being associated with data identifying one or more completion conditions for that process, and one or more of said processes being associated with data identifying completion conditions including one or more lapses of one or more specified time periods in the simulation of a process,

wherein said utilizing said stored model data to determine a minimum possible simulated processing time for each of said identified items of equipment comprises determining a sum of said one or more specified time periods included in the one or more completion

conditions associated with said one or more processes of said items of equipment.

8. (Previously Presented) A method in accordance with claim 7,

wherein said storing model data further comprises associating, with at least some of said number of processes involving said items of equipment, rate data identifying the respective associated process as utilizing a utility at a rate; and

wherein said generating output data comprises, for each step in a simulation, the steps of:

determining whether any process of said plurality of processes to be simulated is associated with rate data;

determining the minimum time increment step size required to complete any of the processes currently being simulated; and

selecting as a time increment step size for generating output data a default time increment step size, if at least one process associated with rate data is to be simulated and said default time increment step size is smaller than said determined minimum time increment step size, and selecting as said time increment step size said determined minimum time increment step size if no process to be simulated is associated with rate data or said default time increment step size is greater than said determined minimum time increment step size.

9. (Previously Presented) A method of simulating an industrial process comprising the steps of:

storing model data indicative of a plurality of processes involving a number of items of equipment to be used in an industrial process to be simulated;

determining a time increment step size to be used with said model data; and

generating output data indicative of a step within a simulation of an industrial process utilizing said stored model data and said determined time increment step size,

wherein said storing model data further comprises storing rate data in relation to at least some of said processes, and

wherein said determining a time increment step size comprises, for each step in a simulations, the steps of:

determining whether any process of said plurality of processes to be simulated is associated with rate data identifying the respective associated process as utilizing a utility at a rate;

determining a minimum time increment step size required to complete any of the processes currently being simulated; and

selecting, as a time increment step size for generating output data, a default time increment step size, if at least one process associated with rate data is to be simulated and said default time increment step size is smaller than said determined minimum time increment step size, and selecting as said time increment step size said determined minimum time increment step size if no process to be simulated is associated with rate data or said default time increment step size is greater than said determined minimum time increment step size.

10. (Previously Presented) A method in accordance with claim 9,

wherein said storing model data further comprises associating utility type data with said at least some of said plurality of processes, and

wherein said generating output data comprises generating, for steps in a simulation, output data associated with items of utility type data utilizing rate data associated with a process being simulated and said determined time increment step size.

11. (Previously Presented) A method in accordance with claim 10, wherein said generating output data comprises determining, for steps in a simulation, output data representative of an instantaneous demand for a utility corresponding to an item of utility type data utilizing determined sums of rate data associated with said utility type data for processes being simulated.

12. (Previously Presented) A method in accordance with claim 10, wherein said generating output data for steps within a simulation comprises:

storing, in association with items of utility data, quantity data indicative of a current quantity of a utility within a simulation, wherein said quantity data is determined utilizing rate data associated with processes being simulated and said determined time increment step size.

13. (Previously presented) A method in accordance with claim 12, wherein said quantity data for a step in a simulation is determined by incrementing or decrementing quantity data associated with utility type data for the previous step in a simulation by the product of said determined time increment step size and the sum of rate data associated with said utility data and processes being simulated.

14. (Previously Presented) A method in accordance with claim 13,

wherein said storing model data further comprises storing, in association with said items of utility type data, minimum quantity data and generation rate data,

wherein said quantity data of for a step in a simulation is determined by incrementing or decrementing quantity data for the previous step in a simulation by the product of said generation rate data and said determined time increment step size if said quantity data is less than said minimum quantity data associated with said utility type.

15. (Previously Presented) A method in accordance with claim 14, wherein storing model data further comprises storing maximum quantity data in association with said items of utility type data,

wherein said quantity data for a step in a simulation is determined by incrementing or decrementing quantity data for the previous step in a simulation by the product of said generation rate data and said determined time increment step size only when said quantity data associated with said utility type does not exceed said maximum quantity data associated with said utility type.

16. (Original) A method in accordance with claim 10, wherein said generated output data associated with utility type data comprises data indicative of the simulated availability of utilities or waste processing capacity.

17. (Previously Presented) A method in accordance with claim 12,

wherein said storing model data comprises storing, in association with at least some of said plurality of processes, data indicative of one or more continuation conditions, and

wherein said generating output data comprises, for each step in a simulation, the steps of.

determining which of said plurality of processes are to be simulated in said step of said simulation;

determining for processes to be simulated associated with data indicative of one or more continuation conditions whether output data generated for the previous step in said simulation fulfills the one or more continuation conditions defined by said data; and

if at least one continuation condition for a process being simulated is not fulfilled simulating a delay in the continued processing of said process.

18. (Previously Presented) A method of simulating an industrial process comprising the steps of:

storing model data indicative of a plurality of processes involving a number of items of equipment to be used in an industrial process to be simulated; and

generating output data indicative of a simulation of an industrial process utilizing said stored model data,

wherein said storing model data comprises storing data indicative of one or more continuation conditions in association with each of said processes, and

wherein said generating output data comprises, for each step in a simulation, the steps of:

determining which of said plurality of processes are to be simulated;

determining for the processes to be simulated whether output data generated for a previous step in said simulation fulfils the one or more continuation conditions defined by the stored data associated with said processes being simulated; and

if at least one continuation condition associated with a process being simulated is not fulfilled by said generated output data simulating a delay in the continued processing of said process.

19. (Previously Presented) A method in accordance with claim 18, wherein said data indicative of one or more continuation conditions associated with a process comprises data defining an equation which quantity data associated with utility type data is required to fulfill.

20. (Previously Presented) A method in accordance with claim 18, wherein said storing model data comprises storing, in association with each of said plurality of processes, data indicative of subsequent processes to be simulated following the completion of each said process, wherein determining which of said plurality of processes are to be simulated comprises:

determining for each process simulated in the previous step of a simulation whether the one or more continuation conditions associated with each process being simulated have been fulfilled; and

determining as processes to be simulated:

processes being simulated for which not all of the continuation conditions have been fulfilled and the processes identified by said stored data as subsequent processes to be simulated which are associated with simulated processes for which all of completion conditions associated with those processes have been fulfilled.

21. (Currently Amended) A method of performing an industrial process ~~comprising the steps of:~~

~~simulating an industrial process in accordance with any one of claims 1, 9 or 18 to determine apparatus required to perform a process;~~

~~providing apparatus corresponding to said items of equipment simulated; and~~

~~utilizing said apparatus to perform said industrial process simulated.~~

according to one of claims 1, 9, or 18, further comprising using the output data to perform the industrial process.

22. (Previously Presented) An apparatus for generating a simulation of an industrial process comprising:

storage means for storing model data indicative of a plurality of processes involving a number of items of equipment to be used in an industrial process to be simulated;

determination means for determining scheduling data for initiating batches against which said processes are to be simulated;

an equipment identifier operable to identify items of equipment liable to be involved in simulated processing of a next batch to be initiated after a latest initiated batch;

a minimum cycle time determination unit operable to determine, for items of equipment identified by said equipment identifier, a minimum possible simulated time required by each identified item for processing said latest initiated batch;

a current cycle time determination unit operable to determine, for each item of equipment identified by said equipment identifier, a greatest time of use for processing previously initiated batches;

a scheduling unit operable to generate scheduling data for scheduling the initiation of a next batch to be initiated after the initiation of a latest initiated batch,

said scheduling unit configured to cause the a time between the initiation of a next batch to be initiated after a latest initiated batch to be equal to the greater of the a maximum of the minimum processing times said minimum cycle time determination unit and the greatest time in use determined by said current cycle time determination unit for items of equipment identified as being liable to process said batch to be scheduled; and

generation means for generating output data indicative of a simulation of an industrial process utilizing stored model data and scheduling data generated by said scheduling unit.

23. (Previously Presented) An apparatus in accordance with claim 22, wherein said current cycle time determination unit comprises:

means for storing, in association with each item of equipment to be simulated, data indicative of it a time of use of said item of equipment for a batch previously processed by said item of equipment,

wherein said current cycle time determination unit determines, as the greatest time of use, the greatest time of use of said stored times of use stored in said means for storing included in said current cycle time determination unit.

24. (Previously Presented) An apparatus in accordance with claim 22, wherein said current cycle time determination unit is configured to:

determine, for each of the said items of equipment identified by said equipment identifier, whether an item of equipment is in use;

determine, if an item of equipment is in use, a total time the item of equipment has been in use for a current batch; and

store, if an item of equipment is no longer in use, said total time in use as said time in use for said equipment.

25. (Previously Presented) An apparatus in accordance with claim 24, wherein said means for storing comprises means for storing model data associating each of said items of equipment with a number of processes, wherein said current cycle time determines whether any of said processes associated with an item of equipment is currently being simulated to determine whether an item of equipment is in use.

26. (Previously Presented) An apparatus in accordance with claim 22, wherein said minimum cycle time determination unit comprises means for storing, in association with each batch to be initiated, data indicative of a greatest of said minimum possible processing times, wherein said minimum cycle time determination unit utilizes said data indicative of the greatest of said minimum possible processing times to generate scheduling data.

27. (Previously Presented) An apparatus in accordance with claim 22, wherein said minimum cycle time determination unit comprises:

means for associating, with a batch to be initiated, data indicative of items of equipment to be utilized in simulated processing of said batch, wherein said minimum cycle time determination unit utilizes said data indicative of the items and associated with said batch.

28. (Previously Presented) An apparatus in accordance with claim 27, wherein said means for storing comprises:

means for associating said items of equipment with data indicative of a number of processes and data identifying one or more completion conditions for each of said processes, at the least some of said processes being associated with data identifying one or more completion conditions including at least one lapse of at least one specified time period in the simulation of a process,

wherein said minimum cycle time determination unit determines a sum of said specified time periods identified as completion conditions for processes associated with said items of equipment.

29. (Previously Presented) An apparatus in accordance with claim 28,

wherein said means for storing further comprises means for associating at least some of said plurality of processes with rate data; and

wherein said generation means further comprises:

means for determining whether any process of said plurality of processes to be simulated is associated with rate data identifying the respective associated process as utilizing a utility at a rate;

means for determining a minimum time increment step size required to complete any of the processes currently being simulated; and

selection means for selecting a default time increment step size as the time increment step size for generating output data, if at least one process associated with rate data is to be simulated and said default time increment step size is smaller than said determined minimum time increment step size, and for selecting said determined minimum time increment step size as said time increment step size, if no process to be simulated is associated with rate data or said default

time increment step size is greater than said determined minimum time increment step size.

30. (Previously Presented) An apparatus for generating a simulation of an industrial process comprising:

storage means for storing model data indicative of a plurality of processes involving a number of items of equipment to be used in an industrial process to be simulated;

means for determining a time increment step size to be used with said model data; and

generation means for generating output data indicative of a step within a simulation of an industrial process utilizing said stored model data and a determined time increment step size,

wherein said means is for storing stores rate data in relation to at least some of said processes, and

wherein said means for determining a time increment step size comprises:

means for determining whether any process of said plurality of processes to be simulated is associated with rate data identifying the respective associated process as utilizing a utility at a rate;

means for determining a minimum time increment step size required to complete my of the processes currently being simulated; and

selection means for selecting a default time increment step size as the time increment step size for generating output data, if at least one process associated with rate data is to be simulated and said default time increment step size is smaller than said determined minimum time increment step size, and for selecting said determined minimum time increment step size as

said time increment step size, if no process to be simulated is associated with rate data or said default time increment step size is greater than said determined minimum time increment step size.

31. (Previously Presented) An apparatus in accordance with claim 29, wherein said means for storing comprises means for associating utility type data with said at least some of said plurality processes, and wherein said generation means outputs data associated with items of utility type data utilizing rate data associated with a process being simulated and said determined time increment step size.

32. (Previously Presented) An apparatus in accordance with claim 31, wherein said generation means outputs data representative of instantaneous demand for a utility corresponding to an item of utility type data utilizing determined sums of rate data associated with said utility type data for processes being simulated.

33. (Previously Presented) An apparatus in accordance with claim 31, wherein said means for storing stores, in association with items of utility data, quantity data indicative of a current quantity of a utility within a simulation, and wherein said generation means outputs quantity data that is determined utilizing rate data associated with processes being simulated and said determined time increment step size.

34. (Previously Presented) An apparatus in accordance with claim 31, wherein said generation means determines quantity data for a step in a simulation by incrementing or decrementing quantity data associated with utility type data for the previous step in a simulation by the product of said determined time increment step size and the sum of rate data associated with said utility data and processes being simulated.

35. (Previously Presented) An apparatus in accordance with claim 34,

wherein said means for storing stores, in association with said items of utility type data, minimum quantity data and generation rate data, and

wherein said generation means outputs quantity data associated with an item of utility type data for a step within a simulation by incrementing or decrementing quantity data for the previous step in a simulation by the product of said generation rate data and said determined time increment step size if said quantity data is less than said minimum quantity data associated with said utility type.

36. (Previously Presented) An apparatus in accordance with claim 35,

wherein said means for storing stores maximum quantity data in association with said items of utility type data, and

wherein said generation means outputs quantity data associated with an item of utility type data for a step within a simulation determined by incrementing or decrementing quantity data associated with said utility type for the previous step in a simulation by the product of said generation rate data and said determining time increment step size only when said quantity data associated with said utility type does not exceed said maximum quantity data associated with said utility type.

37. (Previously Presented) An apparatus in accordance with claim 31,

wherein said means for storing stores, in association with at least some of said plurality of processes, data indicative of one or more continuation conditions, and

wherein said generation means comprises:

means for determining which of said plurality of processes are to be simulated in a simulation step; and

means for determining, for processes to be simulated associated with data indicative of one or more continuation conditions, whether output data generated for a previous step in said simulation fulfills the one or more continuation conditions; and, if at least one continuation condition associated with a process being simulated is not fulfilled by said generating output data, for simulating a delay in the continued processing of said process.

38. (Previously Presented) An apparatus for simulating an industrial process comprising:

storage means for storing model data indicative of a plurality of processes involving a number of items of equipment to be used in an industrial process to be simulated; and

generation means for generating output data indicative of a simulation of an industrial process utilizing said stored model data,

wherein said storage means stores data indicative of one or more continuation conditions in association with each of said processes, and

wherein said generation means comprises:

means for determining which of said plurality of processes are to be simulated in a simulation step; and

means for determining, for the processes to be simulated, whether output data generated for a previous step in said simulation fulfils the one or more continuation conditions associated with said processes being simulated; and, if at least one continuation condition

associated with a process being simulated is not fulfilled, for simulating a delay in the continued processing of said process.

39. (Previously Presented) An apparatus in accordance with claim 37, wherein said means for storing stores data indicative of a continuation condition that comprises data defining an equation which quantity data associated with utility type data is to fulfill.

40. (Previously Presented) An apparatus in accordance with claim 37, wherein said means for storing stores, in association with each of said plurality of processes, data indicative of a next processes to be simulated following the completion of each said process,

wherein said means for determining of which of said plurality of processes are to be simulated comprises:

means for determining, for each process simulated in a previous step of a simulation, whether the one or more continuation conditions associated with each process being simulated have been fulfilled; and

means for determining as processes to be simulated: processes being simulated for which not all of the continuation conditions have been fulfilled and processes identified by data in said storage means as next processes to be simulated which are associated by said data with processes for which said completion conditions have been fulfilled.

41. (Previously Presented) A method in accordance with claim 1, wherein determining scheduling data further comprises:

when a batch is being initiated, determining time remaining in a current shift and re-scheduling said batch if said time remaining is less than an estimated time required far processing said batch.

42. (Previously Presented) A method in accordance with claim 41, wherein said re-scheduling of said batch comprises re-scheduling said batch for the next shift if said time remaining is less than a minimum processing time for said batch.

43. (Original) A method in accordance with claim 41, wherein said estimated time required is determined by calculating the sum of the greater of the greatest time of use of items of equipment utilized in processing said batches and minimum possible processing times for processing said batch in accordance with said model data for said items of equipment.

44. (Previously Presented) An apparatus in accordance with claim 22, wherein said determination means for determining scheduling data includes means for determining time remaining in a current shift when a batch is being initiated, and means for re-scheduling said batch if said time remaining is less than an estimated time required for processing said batch.

45. (Previously Presented) An apparatus in accordance with claim 44, wherein said means for re-scheduling said batch re-schedules said batch for the next shift if said time remaining is less than a minimum processing time for said batch.

46. (Original) An apparatus in accordance with claim 44, wherein said estimated time is determined by calculating the sum of the greater of the greatest time of use of items of equipment utilized in processing said batches and minimum possible processing tunes for processing said batch in accordance with said model data for said items of equipment.

47-51. (Canceled)

52. (New) A computer-readable medium storing instructions for causing a processor to execute a method, the method comprising:

storing model data indicative of a plurality of processes involving a number of items of equipment to be used in an industrial process to be simulated;

initiating a first simulated batch for simulated processing;

generating scheduling data for scheduling the initiation of simulated batches after the initiation of said first simulated batch by, when simulated processing of a latest initiated batch is initiated:

identifying items of equipment liable to be involved in simulated processing of a next batch to be initiated after said latest initiated batch;

utilizing said stored model data to determine for each item of said identified items of equipment a minimum possible simulated processing time required for simulated processing of said latest initiated batch;

determining for said identified items of equipment which are currently in use for processing batches currently being processed, the greatest time of use of previously simulated in processing batches using said items of equipment; and

generating scheduling data for the next batch to be initiated after the latest initiated batch to cause the time between the initiation of said latest initiated batch and said next batch within said simulation to be equal to the greater of the maximum of said minimum possible simulated processing times for said items of equipment involved in simulated processing of said

next batch and said greatest time of use for said identified items of equipment currently in use; and

generating output data indicative of a simulation of an industrial process utilizing said stored model data and said generated scheduling data.

53. (New) A computer-readable medium storing instructions for causing a processor to execute a method, the method comprising:

storing model data indicative of a plurality of processes involving a number of items of equipment to be used in an industrial process to be simulated;

determining a time increment step size to be used with said model data; and

generating output data indicative of a step within a simulation of an industrial process utilizing said stored model data and said determined time increment step size,

wherein said storing model data further comprises storing rate data in relation to at least some of said processes, and

wherein said determining a time increment step size comprises, for each step in a simulations, the steps of:

determining whether any process of said plurality of processes to be simulated is associated with rate data identifying the respective associated process as utilizing a utility at a rate;

determining a minimum time increment step size required to complete any of the processes currently being simulated; and

selecting, as a time increment step size for generating output data, a default time increment step size, if at least one process associated with rate data is to be simulated

and said default time increment step size is smaller than said determined minimum time increment step size, and selecting as said time increment step size said determined minimum time increment step size if no process to be simulated is associated with rate data or said default time increment step size is greater than said determined minimum time increment step size.

54. (New) A computer-readable medium storing instructions for causing a processor to execute a method, the method comprising:

storing model data indicative of a plurality of processes involving a number of items of equipment to be used in an industrial process to be simulated; and

generating output data indicative of a simulation of an industrial process utilizing said stored model data,

wherein said storing model data comprises storing data indicative of one or more continuation conditions in association with each of said processes, and

wherein said generating output data comprises, for each step in a simulation, the steps of:

determining which of said plurality of processes are to be simulated;

determining for the processes to be simulated whether output data generated for a previous step in said simulation fulfils the one or more continuation conditions defined by the stored data associated with said processes being simulated; and

if at least one continuation condition associated with a process being simulated is not fulfilled by said

generated output data simulating a delay in the continued processing of said process.